

WALLACE MILL BRIDGE

(Bridge No. 6081)

Spanning the Little Calfpasture River at Virginia State Route 683

Craigsville Vicinity

Augusta County

Virginia

HAER No. VA-103

HAER

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

Northeast Region

U.S. Custom House

200 Chestnut Street

Philadelphia, PA 19106

HISTORIC AMERICAN ENGINEERING RECORD
WALLACE MILL BRIDGE
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LOCATION: Virginia State Route 683 over Little Calpasture River, Craigsville-vicinity, Augusta County, Virginia.
USGS Craigsville, VA Quadrangle, Universal Transverse Mercator Coordinates: 17.641000.4212220

DATE OF CONSTRUCTION: 1914

BUILDER: Champion Bridge Company, Wilmington, Ohio

PRESENT OWNER: Virginia Department of Transportation

SIGNIFICANCE: The Wallace Mill Bridge is a representative example of a pin-connected low Pratt leg truss typical of late nineteenth and early twentieth century factory-manufactured bridges.

PROJECT INFORMATION: The Wallace Mill Bridge was recorded in 1993-1994 by the Cultural Resource Group of Louis Berger & Associates, Inc., Richmond, Virginia, for the Virginia Department of Transportation (VDOT). The recordation was undertaken pursuant to provisions of a Programmatic Memorandum of Agreement (Draft) among the Federal Highway Administration, VDOT, the Virginia SHPO, and the Advisory Council on Historic Preservation concerning management of historic metal truss bridges in Virginia. Project personnel included Richard M. Casella, Architectural Historian; Alison Helms, Historian; and Bruce Harms, Photographer.

DESCRIPTION

The Wallace Mill Bridge (VDOT Bridge No. 6081) is a single-span, pin-connected steel pony truss bridge which carries Virginia State Route 683 in a northwest-southeast direction over Little Calpasture River, at the junction of Route 683 and Route 684, in Augusta County, Virginia (Figure 1). Overall, the bridge is 80' long. The creek is approximately 75' wide at the bridge, which spans it at a height of 10'. The immediate area around the bridge is open rolling farmland with widely spaced farm complexes and residences.

The truss is a low Pratt leg type, sometimes called a bedstead truss. The type is defined by parallel chords, posts in compression, diagonals in tension, vertical endposts (legs) which extend below the bottom chords to support the truss, and by the absence of portals and a top lateral system. All members of the truss are steel, joined with pinned, riveted, or threaded connections. The truss is 9' high, 14' wide, and 80' long, with five panels each 16' wide (Figure 2).

Top chords are riveted box-sections, 12" x 6-1/2" overall, built with 12" x 1/4" top plate, 6" x 2" side channels with flanges turned out, and bottom stays consisting of 6" long sections of 8" channel spaced 30" on center. Bottom chords vary with each panel. The bottom chords of panel one, which are inclined due to the extended endpost, are 5" x 3" rolled I-beams. These chords have pin plates welded to the end at the first post and may not be original to the bridge. The second panel chords are paired, loop-welded eyebars, 1" x 1-3/4". The center panel chords are paired, loop-welded eyebars, 3/4" x 3".

The vertical endposts, or "legs," are riveted box-sections, 12" x 9-1/4" overall, with 12" x 1/4" top plate, and 9" x 2-3/8" side channels with flanges turned out. The bottom stays of the chord are 7" x 3-5/8" I-beams, 6" long, inset 1", and spaced 3' on center. The endposts extend approximately 3' below the level of the deck and are encased in a concrete abutment of later construction. The intermediate posts are riveted I-sections, 9" x 5-1/2" overall, consisting of 5" x 1-3/4" channels turned out and riveted to a continuous off-center web of 6" x 2" channel. The post channels are stamped "Cambria." Due to the concrete encasement of the endposts, pedestal and bearing types are not visible.

Diagonals in the first panel are paired loop-welded eyebars measuring 7/8" x 2-1/4". Panel two diagonals consist of paired loop-welded eye-bars measuring 7/8" x 1-1/2", and a single counter 7/8" in diameter with a 1-1/4" turnbuckle. Two opposing counters cross-brace the center panel and consist of a 1-1/8" square rod with a 1-1/2" turnbuckle. Top chord pins are 2-1/2" in diameter; bottom chord pins are 2-5/8".

The floor beams are 12" x 5" rolled I-beams, stamped "Cambria," carried by the posts in beam pockets constructed of angles and channels. The beams are bolted into the pockets with 5/8" bolts. Eleven floor stringers, spaced approximately 14" on center, rest on the beams. The two

outside stringers are 6" x 2" channels, and the remaining nine interior stringers are rolled I-beams, 6" x 3-3/8", also stamped "Cambria" (Figure 3). Bottom lateral bracing consists of 3" x 2-1/2" angles, two per panel.

The bridge decking consists of 4" x 10" pressure-treated wood planks, coated with asphalt and attached to the stringers with carriage bolts and deck clips. The roadway is 11' wide and edged with 4" x 6" wood curbing raised 4" off the decking with wood blocks spaced approximately 4' on center. The bridge railings consist of two 2-1/2" angles, 12" and 28" off the deck. The bridge rests on concrete beveled-wing abutments, 16' wide, 8' high with 8' wings.

HISTORICAL INFORMATION

Background

The Estaline Valley, located at the junction of Smith Creek and the Little Calfpasture River in Augusta County, was settled by agriculturalists in the late eighteenth and early nineteenth centuries. The Bashaws and the Wallaces were among the first families to settle in the area. Dr. Darwin Bashaw moved into a two-story brick house on the valley road (presently known as State Route 601) about 1830, and practiced medicine up to and during the Civil War (VDHR file 7-501). W.K. Wallace operated a gristmill on a tributary south of the junction of Smith Creek and the Little Calfpasture River prior to 1865. This mill was transferred to R.S. Craig, a descendant of the founders of Craigsville, by 1885 (Hotchkiss 1865; 1885:84; VDHR file 7-503, 7-502).

The Virginia Central Railroad Company purchased rights-of-way through the Estaline Valley and the area which is presently known as Craigsville in 1853 as part of a plan to build a rail line from Staunton to the Clifton Forge area. The line did not become fully functional until after the Civil War, when, under the operation of the Chesapeake & Ohio Railroad Company, it began to stimulate investment and industrial development in the area. In 1873, the Coral Marble Company was established about one half mile east of Craigsville in a community initially named Marbledale and later known as Fordwick. The local limestone proved not to be a prime-quality building material, and the quarries were sold to the Lehigh Portland Cement Company in 1895 (Nuckols 1991; Tindel 1990).

The Lehigh Portland Cement Company grew into the largest cement producing establishment in the state by 1900, when the business employed approximately 500 people. The success of the cement company spurred development in the community of Craigsville during the late nineteenth and early twentieth centuries. The first schoolhouse was built at Craigsville in 1906 (Nuckols 1991; Tindel 1990).

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Industrial and economic development continued in the area when the Stillwater Worsted Mills expanded in 1929. The company established three plants, one in Augusta Springs, which made wool into yarn; one in Craigsville, which wove the yarn into cloth; and one in Goshen (Rockbridge County), which performed the final fabric-finishing and dyeing processes (Nuckols 1991; Tindel 1990).

The late nineteenth and early twentieth century industrial development of the area extended into the rural Estaline Valley, about two miles south of Craigsville. In 1900, Oswald Wallace built a large, three-story gristmill, with a large Fitch overshot steel waterwheel, on a tributary to the Little Calfpasture River just south of Smith Creek. The new mill replaced an earlier mill which Wallace had operated nearby. Wallace's Mill produced Lady's Choice flour in the early twentieth century until he sold the concern to a Mr. Shanks prior to World War I. After 1940, Justine Daniels purchased the mill and expanded production to include three types of flour and feed (VDHR file 7-502).

History of Wallace Mill Bridge

The Wallace Mill Bridge, also known as the Little Calfpasture River Steel Truss, was built in 1914, at a time when Craigsville and the surrounding rural area was in a period of early twentieth-century economic prosperity. The bridge was built at a point where the precursor to State Route 683 forded the Little Calfpasture River between Wallace Mill and Craigsville. Before the Civil War, and until the early twentieth century, the Little Calfpasture and Smith Creek were forded at various places in the vicinity of the bridge (Hotchkiss 1865; 1885:84).

On February 26, 1914, Oswald S. Wallace, W.L. Bashaw, and others, presented a petition to the Augusta County Board of Supervisors along with the \$265.00 they had raised by subscription toward the construction of a bridge near Fordwick. The petition was referred to the Superintendent of Roads for the County, who was directed to examine the proposed location for the bridge, and report to the Board with plans, specifications, and cost estimates (Augusta County Board of Supervisors Order Book 5:566).

On March 26, 1914, the Road Board of Pastures District filed its report stating that the road between Wallace Mill and Goshen was a rural mail route, and the only road by which people west of the Little Calfpasture River could reach the mill. The existing ford had been in dangerous shape during the previous two months, during which as many as 15 days of high water had prevented crossing. Given the importance of the road, the construction of an 80' span, 12'-wide roadway bridge was recommended. The cost of the superstructure was estimated at \$1,200, and the cost of abutments at \$300. Deducting the subscribers' contribution from the total estimate, the county contribution came to \$1,200. The Board ordered that the bridge be built in accordance with the report of the Road Board, and directed that the cost of construction

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be paid from the County Levy of 1913 (Augusta County Board of Supervisors Order Book 5:574-575).

In April 1913, the year before the bridge was built, spring flooding had done a great deal of damage over the entire Pastures District, particularly in West Augusta (Augusta County Board of Supervisors Order Book 5:467). This situation may have helped convince the Board of Supervisors of the necessity to provide safer crossings over many of the smaller creeks in the area. The Champion Bridge Company of Wilmington, Ohio, was awarded contracts for the construction of five small bridges in the county, and was paid \$4,257.56 for the work on September 28, 1916 (Augusta County Board of Supervisors Order Book 6:319). The bridge over the Little Calfpasture Creek appears to have been one of this group of five (bridge plate; Deibler 1973).

The bridge was maintained using funds from the Pastures District Road Levy during the early twentieth century, but by 1922, the county was loaning county money to the district on a regular basis to help the district qualify for state aid (Augusta County Board of Supervisors Order Book 7:338, 356).

At present, the land on either side of the bridge is owned by members of the Bashaw family. The bridge has been flooded several times, and has withstood piled-up trees and logs. Since the construction of the Augusta County Correctional Center east of Craigsville in 1985, the volume of traffic over the bridge has increased to the point where three times a day, between 10 and 15 cars cross from the prison. Damages and stresses from flooding and increased traffic have contributed to the deterioration of the bridge in recent years (Clements 1991:81; Nukols 1991; VDHR file 7-507, notes from VDOT Metal Truss Bridge Tour, Lower Valley, June 30, 1993).

Thomas Pratt and the Pratt Truss

Thomas Pratt was born in Boston in 1812, entered Rensselaer Polytechnic Institute at age 14, became an engineer with the United States Army Engineers at 18, and began a professional engineering career with Boston & Maine Railroad at age 21. Pratt worked his entire life in the employ of various New England railroad companies (American Society of Civil Engineers [ASCE] 1876:332-333; Condit 1960:108).

Pratt is famous for a bridge truss that he designed in 1842 that consisted of two parallel chords connected by vertical wood posts in compression and double wrought iron diagonals in tension. Pratt's design was similar to an earlier truss patented by William Howe, but structurally opposite in that Howe's design put the verticals in tension and the diagonals in compression. The Pratt truss is considered to be the first scientifically designed truss, incorporating what are now considered basic structural engineering principles (Condit 1960:109). Pratt used shorter

compression members, allowing members of smaller cross section to be used without sacrificing overall strength. This innovation provided a lighter truss requiring less materials, yet offered greater span and load bearing capability than the other truss designs of the time.

In 1844, Pratt was granted a patent for two truss designs, one with parallel chords, and one with a polygonal top chord. The polygonal version reflected Pratt's understanding of the application of mathematical principles in calculating the forces involved and the precise strength of material required to counter those forces. Pratt's patent was renewed in 1858. The use of the Pratt truss for the deck of John Roebling's Niagara River Suspension Bridge in 1855 drew worldwide attention to the design and undoubtedly contributed to its increased use. By 1889, the truss in its iron form ranked first in usage for railroad bridges. Thousands of bridges, both highway and railroad, have been built following the Pratt design or some variation (ASCE 1876:334-335; Condit 1960:111, 112, 302; Cooper 1889:11; Johnson 1929:179).

Champion Bridge Company

The Champion Bridge Company was founded by Zimri Wall, who was building wood truss bridges in Clinton County, Ohio, as early as 1860. He was joined by his brother Jonathan in 1871 to form Z. & J. Wall & Company. They began experimenting with wrought iron for bridge construction and patented an iron truss arch bridge in 1873 which they sold under the name "Champion Wrought Iron Arch." The partnership was renamed the Champion Iron Bridge & Manufacturing Company and the first fabrication shops were built in Hamilton, Ohio (Miars 1972:7).

The operation moved to Wilmington, Ohio, in 1875, incorporated in 1878, and changed its name to the Champion Bridge Company in 1881. Abel C. Briggs joined the firm in 1884 and held the positions of Chief Engineer from 1885-1916, and President from 1916 to his retirement in 1934 (Miars 1972:15). Champion expanded rapidly during the period of 1885-1910 and opened offices in Birmingham, Atlanta, and Chattanooga to reach the southern market. A major expansion and modernization of the fabrication shops was undertaken in 1893 (Miars 1972:19). Cash L. Richardson was hired in 1905 as erection foreman and achieved recognition upon his death in 1965 for having erected more bridges than any other man in the United States. Richardson was responsible for the erection of most of the Champion bridges in Virginia, including the 1,023' New River Bridge at Narrows, Virginia, one of the heaviest bridges built by the company. This five-span camelback bridge was replaced in the 1960s (Miars 1972:23, 27).

Through the twentieth century, the Champion Bridge Company continually diversified its manufacturing capabilities to include the construction of concrete bridges, steel building frames, and material handling equipment. In the mid-1970s, the company ceased its bridge construction

and repair operations completely, ending what may have been the longest continually operated bridge company in the United States (Miars 1972:33).

According to *A Survey and Photographic Inventory of Metal Truss Bridges in Virginia, 1865-1932*, a study conducted by the VDOT Research Council in 1973, the Champion Bridge Company built a total of forty-seven metal truss spans in Virginia: twenty-six in the Staunton VDOT Construction District, five in the Culpeper District, one in the Lynchburg District, eleven in the Salem District, and four in the Bristol District (Deibler 1973). Two other Champion Company bridges, Knightly Bridge (VDOT Bridge No. 6149) and Mount Meridian Bridge (VDOT Bridge No. 6729), both in Augusta County, are included in the seventeen historic metal truss bridges recorded by VDOT in 1993-1994, of which this report is a part.

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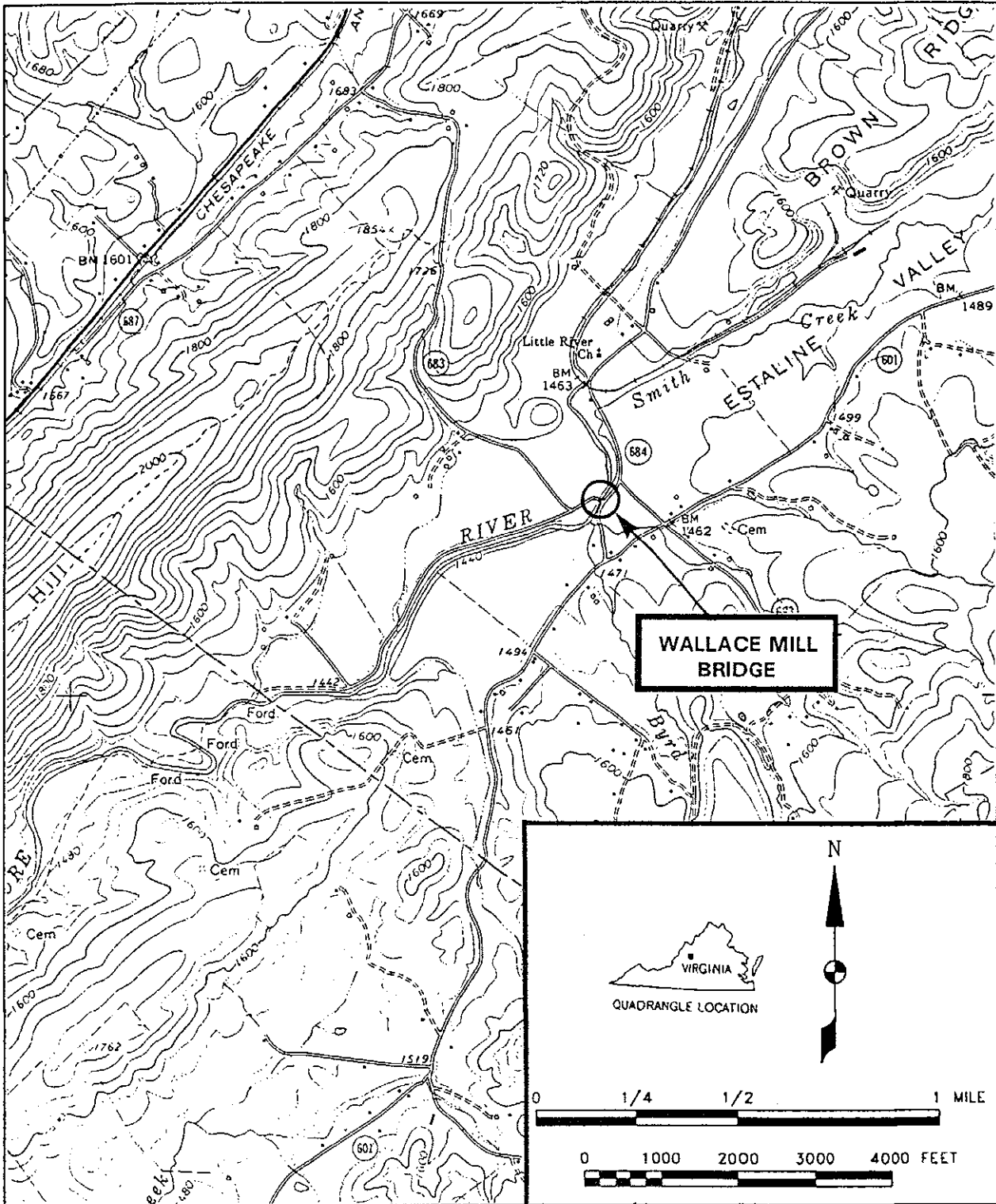


FIGURE 1: Location Map

SOURCE: USGS 7.5 Minute Quadrangle, Craigsville, VA, 1967
(Photorevised 1978)

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SOURCE: Virginia Department of Transportation 1974

FIGURE 2: Original Bridge Report, Bridge No. 6081, July 26, 1974

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SOURCE: Virginia Department of Transportation 1974

FIGURE 3: Original Bridge Report, Bridge No. 6081, July 26, 1974